



# Weather and Climate

## Western Arctic Summer 2014 Weather Summary



### Kotzebue Summer Weather 2014

The average temperature for June in Kotzebue was 44.2° F compared to a normal of 45.7° F. Last summer was 6.6° F warmer than 2014 (2013 was also the third warmest summer since 1949). Only 0.38 inches of rain fell in June. A trace of snow was recorded on June 1. Overall, June precipitation was 66% of normal.

July 2014 averaged 53.6° F, 1.0° F cooler than the 1981-2010 normal. High temperatures on July 6 (77° F) and July 7 (80° F) broke daily records. Temperatures cooled later in the month. July 13-27 were all below normal. The precipitation total for the month was 2.59 inches, 178% of normal. Almost all of the rain fell in the cool period July 13-27.

August was hot. The mean monthly temperature was 58.4° F, 6.7° F warmer than normal. The first 27 days of the month were warmer than normal. In fact, each day from August 6 to 16 had daily minimum temperatures that were warmer than the normal high temperatures. 2014 ended up as the third warmest August on record, behind 2004 and 1977. Precipitation was below normal with 1.51" in August compared to a normal monthly total of 2.18 inches. (Figures 1 and 2; Tables 1 and 2)

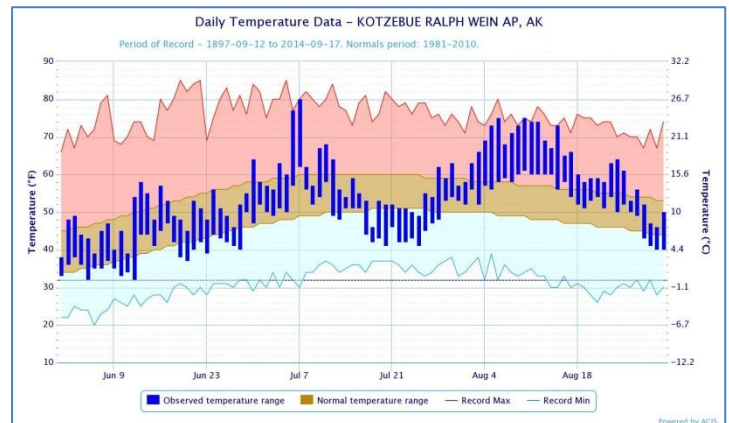


Figure 1. Summer 2014 daily temperatures at Kotzebue showing record maximum (red), record minimum (blue), normal (brown) and 2014 observed range (blue bars).

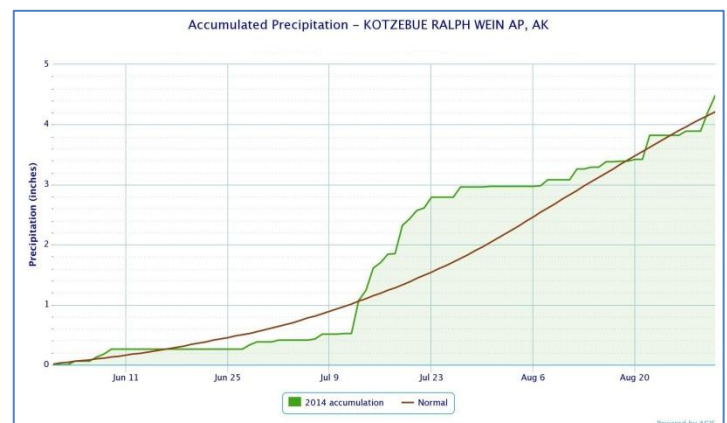


Figure 2. Summer 2014 accumulated precipitation at Kotzebue (green) compared to normal (brown line).

Table 1. Temperature: Summer 2014 average monthly temperatures compared to the 1981-2010 normal.

Summer 2014	Average Monthly Temp °F	1981-2010 Normal °F	Departure from Normal °F	Monthly High °F / Date	Monthly Low °F / Date
June	44.2	45.7	-1.5	64 / June 30	32 / June 5, 12
July	53.6	54.6	-1.0	80 / July 7	41 / July 20, 25
August	58.4	51.7	+6.7	75 / Aug 6, 10	40 / Aug 30, 31

Summer Season Temperature Departure from Normal: +1.4°F

Table 2. Precipitation: Summer 2014 monthly precipitation totals compared to normal.

Summer 2014	Total Monthly Precip. in.	1981-2010 Normal in.	Departure from Normal in.	Greatest 24 -hr. total in. / Date	# Days with $\geq 0.01$ in. water
June	0.38	0.58	-0.20	0.08 / June 9	6
July	2.59	1.45	+1.14	0.55 / July 13	17
August	1.51	2.18	-0.67	0.40 / Aug 22	11

Summer Season Precipitation Departure from Normal: +0.27 inches (106% of normal).

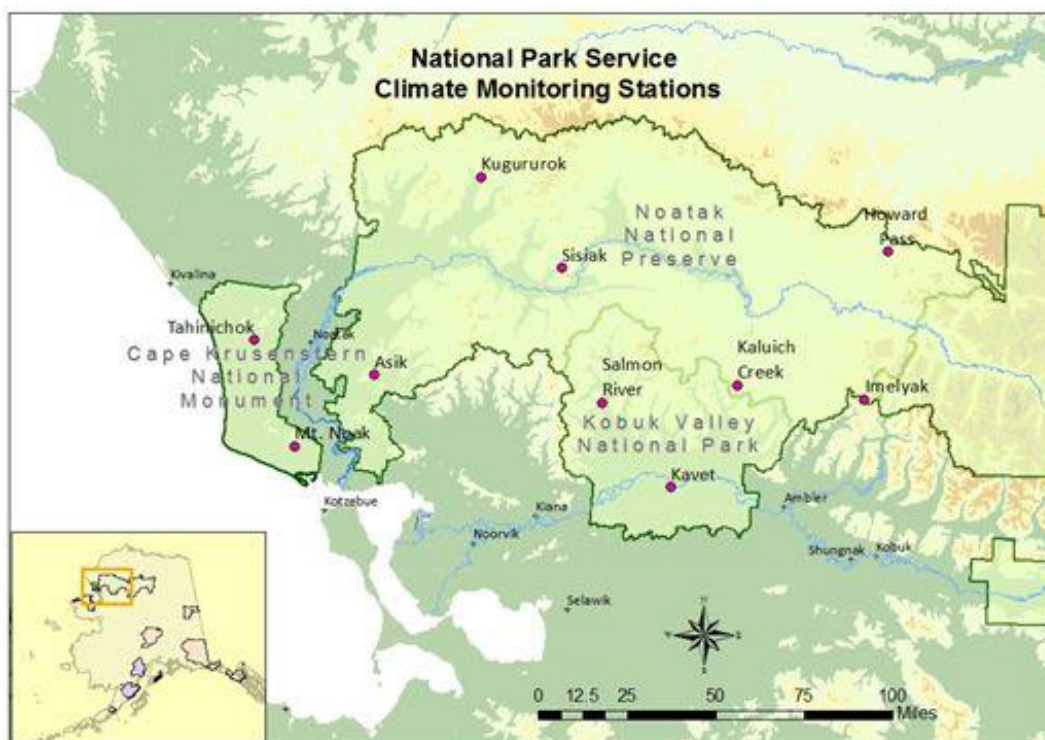


Figure 3. NPS Climate stations in Western Arctic Parklands.

Table 3. Summary of weather statistics from climate stations in and near Western Arctic Parklands. All data are preliminary and subject to review.  
 \*NPS stations installed between 2011-2014.

Site	Elev. (ft)	Average Temp °F			Rainfall (inches)**			Peak Wind Speed (mph)
		June	July	Aug	June	July	Aug	Summer
*Asik	1329	46.4	49.1	52.1	1.0	4.2	3.2	32
*Howard Pass	2062	43.6	47.6	45.2	1.3	2.8	1.2	M
*Imelyak	3569	40.9	44.1	47.1	2.5	8.2	2.8	29
*Kaluich	2486	44.1	46.9	46.9	2.1	2.8	2.6	48
Kavet Creek	235	54.4	56.5	56.9	2.0	4.3	0.9	47
Kelly	382	51.5	54.1	55.5	1.1	2.6	1.6	30
*Kugururok	1020	NA	NA	52.1	NA	NA	1.29	NA
*Mt. Noak	809	M	M	53.4	M	M	1.1	M
Noatak RAWS	985	49.4	52.6	50.9	1.8	3.0	0.9	40
Red Dog Mine	942	47.6	50.3	53.6	1.1	3.3	2.6	25
*Salmon River	1201	M	M	52.4	M	M	1.33	M
*Sisiak	1823	45.7	48.7	48.9	1.7	3.0	0.7	29
*Tahinichok	966	45.4	49.1	52.7	M	M	0.6	30

#### Interesting notes from RAWS stations:

- For the sites in Table 4, the average difference in June mean temperatures between 2014 and 2013 was -7.2°F.
- For August, most sites were 3 to 4°F warmer in 2014 compared to 2013. However, Howard Pass was 0.9°F cooler in 2014.
- The Kugururok station was installed in late July 2014 at an elevation of 1020 feet (Figures 3 and 4). The mean August temperature at Kugururok was 52.1°F. The Kelly RAWS site, about 35 miles downriver at 382 feet had a monthly average August temperature of 55.5°F.
- The Imelyak station (elevation 3569 feet) in eastern NOAT recorded 8.2 inches of precipitation in July, substantially more than any other station analyzed.

## New Station at Kugururok

A new station was installed near the upper Kugururok River in the northwest section of Noatak National Preserve. On July 18, 2014 Arctic Network staff assembled the station near the confluence with Kagvik Creek. The climate station takes hourly measurements of air temperature, relative humidity, wind speed and direction, solar radiation, snow depth, and rainfall. As with all NPS stations, data are transmitted hourly and available online at [mesowest.utah.edu](http://mesowest.utah.edu). The direct link to the new Kugururok station (Figure 4) is hyperlinked [here](#). This is the ninth station installed in WEAR since 2012. No additional long-term climate monitoring stations are planned. The new stations will continue to complement the long-term record from the National Weather Service station in Kotzebue and provide critical data along a high elevation east-west transect across the western arctic. Data are helping characterize the climate gradients and patterns affecting resources in WEAR. Table 4 summarizes the summer data for the new sites.



Figure 4. New climate station at Kugururok

## Kotzebue Summer Temperature Trend

The average summer temperature for 2014 was 52.1° F, the 14<sup>th</sup> warmest summer since 1949 and 1.9° F warmer than the long-term average.

We calculate the average summer temperature by simply taking the average of June, July, and August monthly temperatures. Average summer temperatures show great variability with a range between 46.4° F in 1975 and 57.3° F in 2004.

There has been a significant increase in summer temperatures of 0.4° F per decade since 1949 based on a simple linear regression ( $p < 0.01$ ). The 10-year moving average shows the coolest period in the mid-1970s. 2004 stands out as the warmest summer and was 4.4° F warmer than the next warmest summer of 2007. Four out of the ten warmest summers since 1949 have occurred in the last ten years (Figure 5).

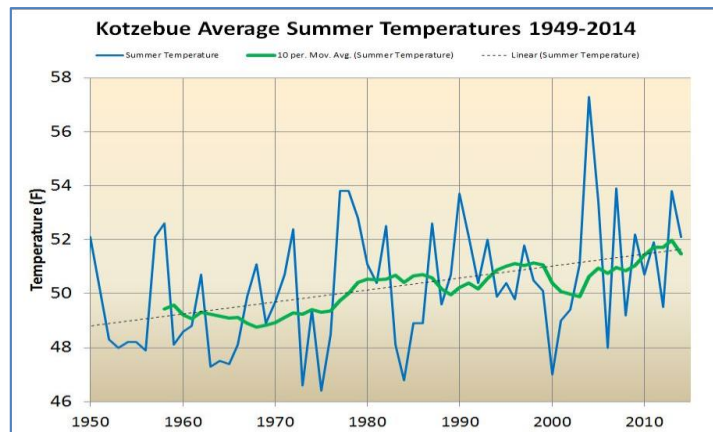


Figure 5. Average summer temperatures (June, July, August) at Kotzebue since 1949. The green line is a 10-year moving average. The dashed line is a simple linear regression.

## Connecting Further

- New paper published – [Recent Sea Ice Increase and Temperature Decrease in the Bering Sea area, Alaska](#)
- Previous weather summaries and other climate monitoring documents on the [Arctic Network web portal](#)
- Access near real-time data from [Western Regional Climate Center](#) and [MesoWest](#)
- Statewide summary of weather highlights in the latest [Alaska Climate Dispatch](#) from the Alaska Center for Climate Assessment and Policy
- [Maps](#) of projected temperature and precipitation changes for Noatak, Kobuk and Cape Krusenstern.

## More Information

Pam Sousanes  
Email: [pam\\_sousanes@nps.gov](mailto:pam_sousanes@nps.gov)  
Phone: 907-455-0677

Ken Hill  
Email: [kenneth\\_hill@nps.gov](mailto:kenneth_hill@nps.gov)  
Phone: 907-455-0678  
<http://science.nature.nps.gov/im/arcn>